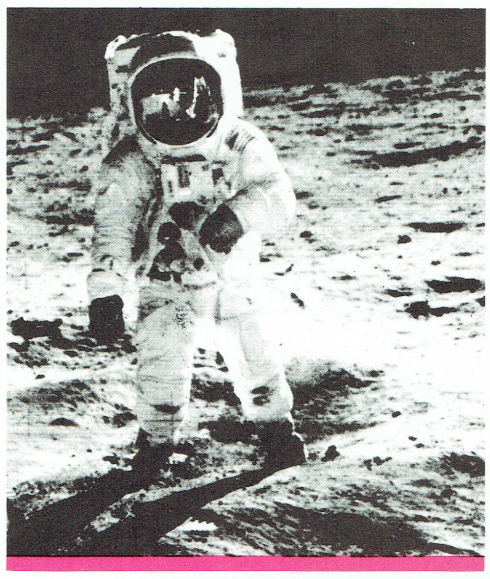
Computers

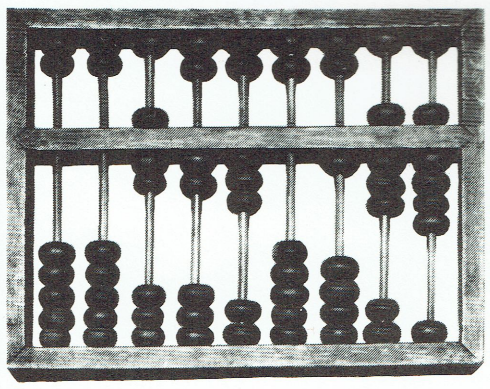
The inventions of the telephone and television have been responsible for many changes to society that we know today, but it is the computer that is set to alter it almost beyond recognition. Both feared and welcomed, the computer has effected many changes to the way we go about our daily life, and will continue to do so as its technology and efficiency increases.

Without the ability of computers to handle vast quantities of complex calculations it is doubtful whether man would have stood on the moon. Without computers, many of the business transactions and telecommunication facilities we already take for granted would not be possible.



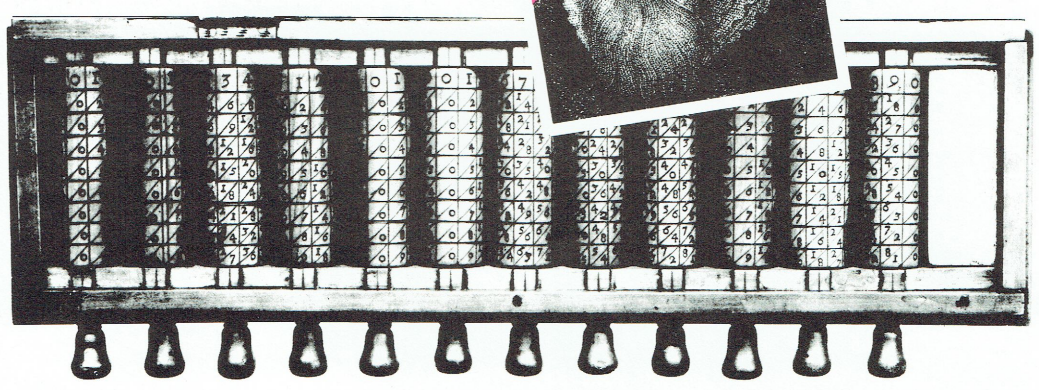
Today the word computer is almost only used to mean an electronic machine capable of carrying out mathematical calculations under instruction. Once the word meant only a person who carried out such calculations, when, a century ago, young men were employed as 'computers' in banks and in astronomical observatories.

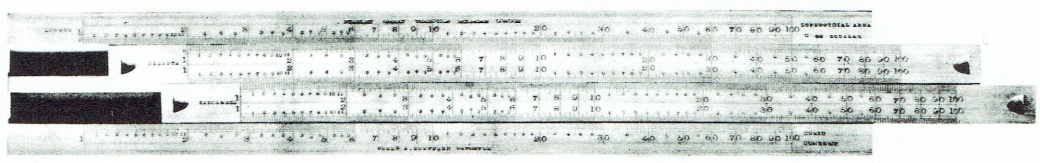
Carrying out repetitious arithmetic tasks is, however, a boring job subject to error, and it is not surprising that efforts were made to replace the human with the automatic computer. Aids to calculations are almost as old as civilisation itself, and were a constant aim of human endeavour.



For example, the abacus, a series of parallel wires or rods strung with beads and used for complex arithmetic calculations, is over three thousand years old, and is still used today in some Asian countries. More sophisticated devices for solving mathematical problems began to appear in the 17th century with such things as John Napier's 'Bones' and William Oughtred's slide rule.

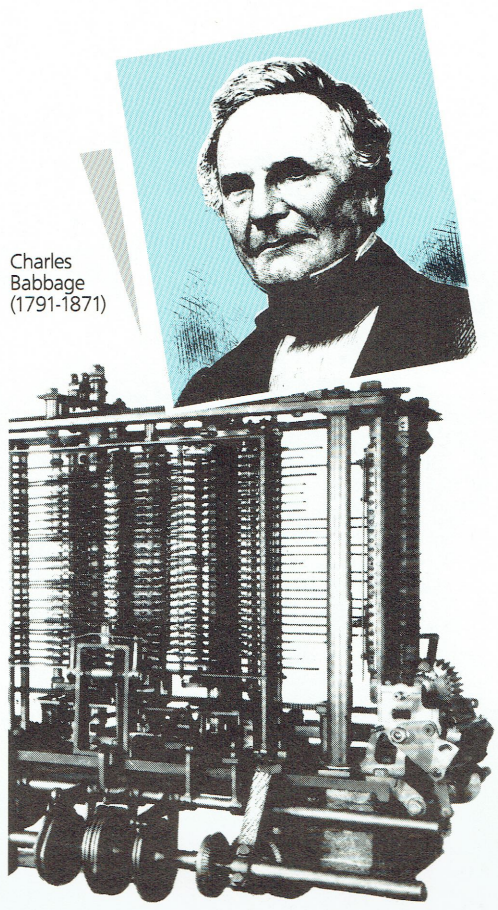
John Napier (1550-1617) and his 'Bones'





An early slide rule

The first attempts to build a machine capable of carrying out a whole series of sums under instruction were, however, made by Charles Babbage (1791-1871) in England. He designed, but never completed, two kinds of calculating machines which he called the Difference Engine and the Analytical Engine.



Charles Babbage (1791-1871)

The Babbage Analytical Engine

The Analytical Engine was the true forerunner of today's electronic computers, though it was to work entirely by mechanical means using gears and cogs. It was to have been capable of carrying out any kind of calculation whatsoever, following instructions given to it ('or programming') in the form of a series of punched cards.

But Babbage's ideas, like those of Swinton with television, were too far ahead of the times. His unfinished machine is now preserved in London's Science Museum, whilst Babbage, the 'grandfather' of the modern computer, spent his later years trying, unsuccessfully, to produce an infallible system for winning at horse races.

The first true computers had to wait until the middle of our century before they became technically feasible. Controversy still reigns over who actually invented the modern electronic computer, but it was the advent of the Second World War that provided a boost to research into that field.

In Britain, a team led by Dr Tommy Flowers, an engineer in the British Post Office's Research Department, had, by 1943, designed and produced a computer called COLOSSUS. Used to successfully crack the German code known as 'Enigma', it stretched across seven equipment racks and contained 2,400 valves. It was Britain's first electronic program-controlled digital computer.

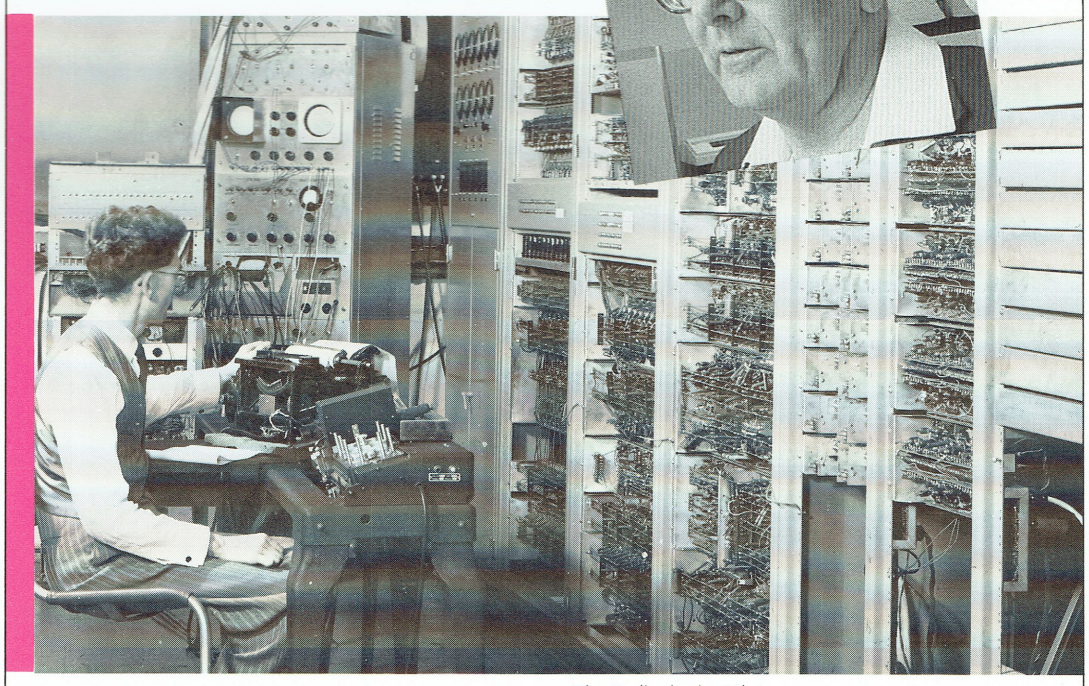
In America, following on the early work of the Iowa physicist Dr John V. Atanasoff, two scientists at the University of Pennsylvania, Dr John W. Mauchly and Dr J. Presper Eckert built, in 1946, a machine they called ENIAC (short for Electronic Numerical Integrator And Calculator).

Dr John W Mauchly and Dr J Presper Eckert

The ENIAC computer built in 1946

Their computer weighed almost 30 tonnes and drew so much power that the lights of West Philadelphia dimmed whenever it was switched on. Containing some 18,000 valves, it was designed to calculate, among other things, the trajectories of shells, and was later used to aid in the design of the hydrogen bomb.

Dr Trevor Pearcey, designer of Australia's first computer

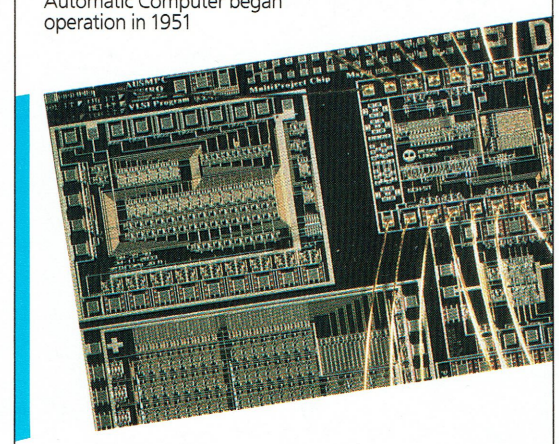


Work on Australia's first electronic computer began in 1947 with the efforts of Dr Trevor Pearcey and his colleague, Maston Beard, at the CSIRO's Division of Radiophysics. Their finished product, the Radiophysics Mk 1 Automatic Computer, as it was then known, began operation in 1951–in time for the first Australian Computing Conference–and was used by radiophysicists, the CSIRO and outside authorities like the Snowy Mountains Authority. Transferred to Melbourne University in 1956 and renamed CSIRAC, the computer was used by the Australian scientific community in general until finally being 'retired' to the Science Museum in 1964.

Since then, computers have become far more powerful, smaller and cheaper, and have already found their way into our homes in the form of electronic games, home computers and as controllers of home appliances.

This has been brought about by the technology of the semiconductor integrated circuit or microchip, which has formed the cornerstone or building block of the information revolution. Rendering valves obsolete, the transistor, and later the microchip have allowed for huge reductions in the size of computers.

The Radiophysics Mk 1 Automatic Computer began operation in 1951



Advances in this technology have been, and are, extremely rapid, especially in the terms of the number of circuit elements contained in a single chip, which can already contain more than 100,000 elements. It means that today it is possible to buy a programmable computer which will fit into a pocket.

Videotex is only one part of, but in future could well act as a focus for, the revolution in computer based information handling in the home.

Computer convergence

Five centuries ago a German, Johann Gutenberg, invented printing using movable type cast from molten lead, and in 1454 produced the world's first printed book–three hundred copies of the so called Gutenberg Bible. His invention was to cause a mediaeval 'Information Revolution', when printing became the crucial technology that was to fuel the modern world in all its complexity.

Johann Gutenberg (1400-1468) the inventor of printing from movable type

Gutenberg's Bible

Printing, being an easier and faster way to reproduce, find, store and spread ideas, was to be the cause of major cultural and economic changes to society. By 1500, for example, there were already up to nine million printed copies of thirty thousand different works in print.

Expressed in modern terms, printing opened up the 'data bases' of the multinational corporations of the time, by giving more people readier access to information previously contained in the then handwritten libraries of the monasteries and abbeys.

Computers today are about to have the same effect, particularly when they are linked to telecommunications. That process is known by the term 'computer convergence', where information in all its forms (such as voice, text or pictures) is stored, transmitted and accessed by digital means–that is, by computers talking to other computers via computer controlled telecommunications facilities.

Printing is now almost too expensive for the spreading, too bulky for the storage, and too difficult for the finding of information. For many of today's information needs, it is nearly obsolete.

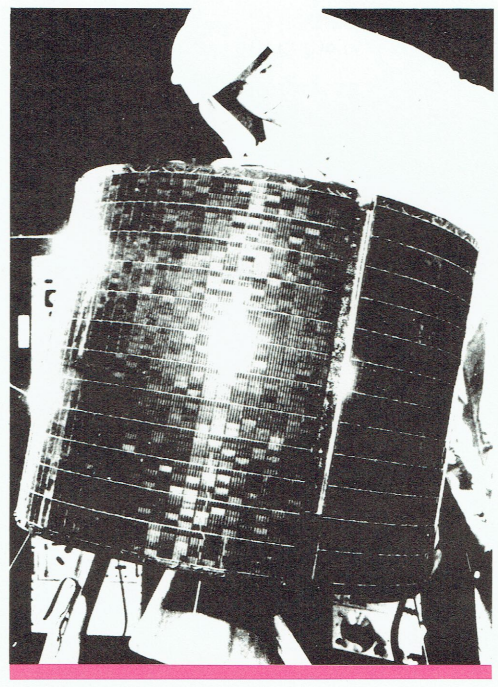
The magnetic memory of only one computer disk pack can store some 20 million words, which in a library would take up many metres of shelf space. Not only that, but with modern telecommunications those 20 million words can be remotely and easily accessed by anyone with the proper computer link.

The phenomenon of computer convergence in the new information technology is best seen in newspapers. During the 1970s, newspaper newsrooms throughout America began installing Video Display Terminals (VDTs), radically changing the roles of journalists and print staff alike.

Reporters write and correct their stories on VDTs, and once edited, a keyboard command is given so that a computer drives phototype-setting equipment to put the story in type. Typewriters have disappeared from many newsrooms, where, before printing, the only copy of a story exists merely in the memory of a computer.

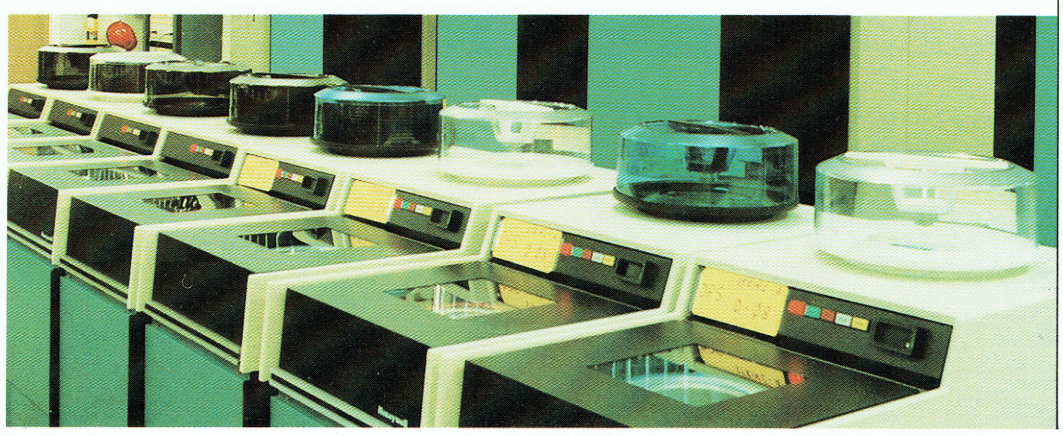
One example of this is the Los Angeles Times, where their system has 341 VDTs and 12 computers, with an additional 94 terminals located up to 4,800 kilometres away. Personnel can communicate to all parts of the system (which also includes a 120,000 word computerised dictionary) at a rate of up to 9,600 words per minute.

Adding to the communications possibilities for newspapers are space satellites.



Intelsat 1 (Early Bird), The world's first commercial communications satellite

A bank of computer disk drive units, enabling huge amounts of data to be stored off-line



The New York based Wall Street Journal has already pioneered the transmission of entire editions by satellite to printing sites throughout America.

It is now possible to eliminate hard copy newspapers, and, in the future, to substitute electronic newspapers on home television terminals, an idea made feasible by videotex.

With such modern mediums and technologies, such as videotex and its broadcast version, teletex, these computer systems are causing a revolution in the spreading of information, ideas and entertainment. Newspapers, highlighted above, are but one part of that information revolution.

The computer based revolution is happening in other countries also. In Britain, the famous Oxford English Dictionary has been rendered into electronic type. Its 13 volumes and 16,750 pages have been computerised, which will not only make the job of rewriting it easier, but will also put it 'on line' to computer screens the world over.


THE AGE
Tuesday 12 June 1984 250 Spencer St. Melbourne, 60 0421 (Classified 60 0611) 42 Pages 130th Year 30c
er siege, but to the children it means victory
TONY WALKER in Basra
WANTED YOUR HOUSE TO SELL
Warne & Wilson
The Courier
117th Year of Publication 25
BALLARAT, FRIDAY, JUNE 8, 1984
Inside today
'Ghost' town fears for Ballarat, says

In Australia, many newspapers have already introduced computer working, including not only metropolitan newspapers, such as 'The Age', but also country papers, such as 'The Ballarat Courier.'

Such bodies as governments, universities and the larger business houses have also already made much use of computers and computer links. Their use has perhaps been most evident in the world of banking, travel, and libraries.

What makes the phenomenon of computer convergence feasible is the fact that telecommunication facilities are not only controlled by, but also have been adapted to, computers. Modern telephone exchanges are nothing more than large computers, handling the transmission and routing of communication traffic, of which the normal telephone conversation is but one, though still the dominant, aspect.

In the modern business world, data or non-voice communication links have become vital. Such links are a growing part of the Australian telecommunications network.

A telex machine, one form of non-verbal communications over the telecommunications network

What will unify data links with voice communications is the use of digital transmission systems.

A signal, transmitted by whatever means (such as optical fibre, copper wire, or microwave) will be sent in a digital form. In such a way, voice, pictures or text will become indistinguishable from each other, being universally represented by a series of fast moving binary dots instantly recognisable by a computer. The only difference, if any, will now be only in the speed of transmission. (For further information, see Telecom's Information Kit No 1–From Dots to Data, The Story of Digital Transmission and Data Communication.)

With the advent of videotex, however, it is becoming possible for everyone to have the same facility to find, control and use information in their own home. In other words, it will bring to the general public what has previously tended to be more the preserve of larger private organisations–information.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MELBOURNE
International Airport
13.5mi/21km NW of city
Regular bus service between city centre and airport.
AIRPORT FACILITIES: Duty Free Shop
CAR HIRE AVAILABILITY: (Tel:03)
Avis 3381800
Hertz 3344044
INTERNATIONAL DEPARTURE TAX: A$10
Through services to:
Amsterdam Frankfurt Paris
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Bombay London Sydney
Los Angeles
KEY: 1 Index to countries
2 Australia 3 Sydney
4 Hotels

However, the normal telephone line, when connected to the videotex system, will be the means of allowing the person at home to tap into the computer world outside, and will allow him or her to become part of it, in a way not possible before.

Telecom Australia